Azimuthal anisotropy of K^0_S and Λ at mid-rapidity from Au+Au collisions at $\sqrt{s_{\rm NN}} = 130$ GeV

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In high-energy nuclear collisions, an initial geometric anisotropy can be established from the overlapping of the colliding nuclei. The amount of time necessary to build up this spatial anisotropy is believed to be very short because two colliding nuclei, which are highly Lorentz contracted in the center-of-mass system, pass through each other with approximately the speed of light. During a period that may last from several to tens of fm/c, rescattering among participants transfers the initial spatial anisotropy into the measured momentum anisotropy that is manifested most strongly in the azimuthal angular distribution[1].

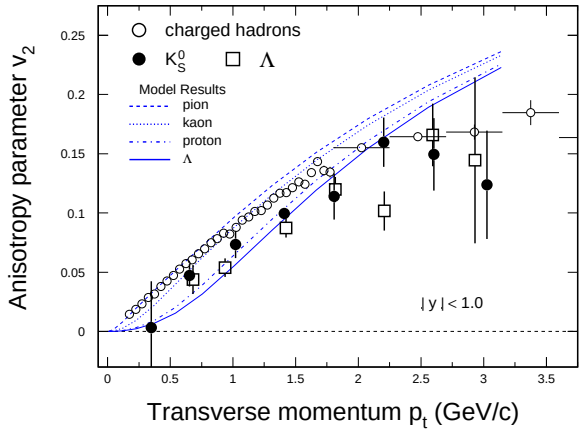

Figure 1: *Azimuthal anisotropy parameters v_2 as a function of p_t for strange particles K^0_S (filled circle) and $\overline{\Lambda}/\Lambda$ (open squares) from minimum bias Au+Au collisions. Dashed-lines are from hydrodynamic model calculations for (from top to bottom) pions, kaons, protons, and $\overline{\Lambda}/\Lambda$.*

The extent to which the initial spatial anisotropy is transformed to the momentum anisotropy depends on the initial conditions and the dynamical evolution of the collision. In particular, anisotropy measurements for nucleus-nucleus collisions at RHIC energies may provide information about the partonic stage that existed early in the collision evolution.

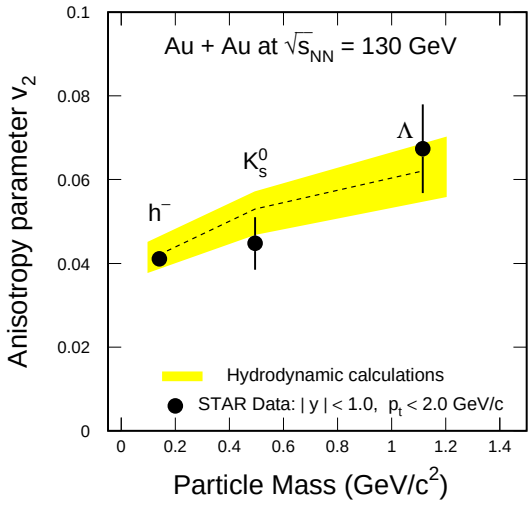

Figure 2: *Integrated azimuthal anisotropy parameters v_2 as a function of particle mass. Gray-band indicates the hydrodynamic model results.*

One sees in Fig.1 that at low transverse momentum region $p_t \leq 1.5$ GeV/c, all particles behave as predicted by the hydrodynamic model. At higher p_t, however, v_2 for all particles seems to saturate. Since the yields of particles are concentrated at $p_t \leq 1.5$ GeV/c, the integrated values are consistent with the hydrodynamic model calculations, see Fig. 2. It is worth noting that the physics underlying the saturation of v_2 at high p_t is not understood. It is also clear that more data and greater statistics will be crucial to the study of these physical effects.

Footnotes and References

[1]H. Sorge, Phys. Rev. Lett. **82**, 2048(1999); J.-Y. Ollitrault, Phys. Rev. **D46**, 229(1992); B. Zhang, M. Gyulassy, and C.M. Ko, Phys. Lett. **B455**, 45(1999); P. Huovinen, P.F. Kolb, U. Heinz, P.V. Ruuskanen, and S. Voloshin, Phys. Lett. **B503**, 58(2001).